

Test

1

Total mark

10

Answer the following questions :

A Choose the correct answer :

(8 marks)

- 1 We have got the refractive index of four materials, which result of the four is incorrect ?
 - (a) 0.8
 - (b) 1.3
 - (c) 1.5
 - (d) 1.8
- 2 The intensity of sound weakens as we go away from its source, because
 - (a) $I \propto \frac{1}{d}$
 - (b) $I \propto d$
 - (c) $I \propto \frac{1}{d^2}$
 - (d) $I \propto d^2$
- 3 The colour in the spectrum colours has the highest frequency.
 - (a) violet
 - (b) green
 - (c) red
 - (d) yellow
- 4 If the angle between a reflected light ray and a reflecting surface is 30° , so the angle of reflection will be equal to
 - (a) 15°
 - (b) 30°
 - (c) 60°
 - (d) 90°

B Give a reason for the following :

(2 marks)

Man can't hear all sounds produced by dolphins.

Test**2**

Total mark

10

Answer the following questions :**A Choose the correct answer :**

(8 marks)

- 1** A student rotates Savart's wheel with different velocities, the velocity which gives more rough sound is
- (a) 20 rotation/sec. (b) 300 rotation/min.
(c) 6 rotation/sec. (d) 10 rotation/sec.
- 2** If the frequency of red colour is 4×10^{12} Hz, so the frequency of violet colour is $\times 10^{12}$ Hz.
- (a) 1.5 (b) 3.5
(c) 4 (d) 7
- 3** If the angle between the incident light ray and the reflected light ray is 90° , so the angle of incidence equals
- (a) 0° (b) 30°
(c) 45° (d) 90°
- 4** A sound travels in air with velocity 330 metre/sec. and has a wavelength 0.1 meter, so its frequency equals
- (a) 330 KHz. (b) 3300 Hz.
(c) 33 KHz. (d) 330 Hz.

B Give a reason for the following :

(2 marks)

The light of the Sun is a complex light.

Test**3**

Total mark

10

Answer the following questions :**A Choose the correct answer :**

(8 marks)

1 All of these sounds are of uniform frequency, except the sound of

(a) violin.

(b) guitar.

(c) loudspeakers.

(d) piano.

2 The distance that the light travels in one second is

(a) the light frequency.

(b) the light speed.

(c) the light intensity.

(d) the light energy.

3 Light is reflected when it falls on a rough surface.

(a) regularly

(b) irregularly

(c) and refracted

(d) in one direction

4 The angle of incidence of light is its angle of reflection.

(a) larger than

(b) smaller than

(c) equal to

(d) double to

B What is meant by ...?

(2 marks)

Infrasonic waves.

Test**4**

Total mark

10

Answer the following questions :

A Choose the correct answer :

(8 marks)

- 1 As the number of teeth of the gear in Savart's wheel increases, the of the produced sound increases.
- (a) amplitude (b) intensity
(c) frequency (d) quality
- 2 Photon energy = Planck's constant \times
- (a) photon frequency. (b) photon wavelength.
(c) amplitude. (d) photon velocity.
- 3 Light refraction is due to the difference in through different media.
- (a) sound intensity (b) nature of sound wave
(c) light velocity (d) sound velocity
- 4 Sound of frequency 200 Hz is the sound of frequency 100 Hz.
- (a) harsher than (b) sharper than
(c) low pitched than (d) rougher than

B What happens when ...?

(2 marks)

Incidence of a white light ray on one face of a triangular glass prism.

.....

.....

Test**5**

Total mark

10

Answer the following questions :**A Choose the correct answer :**

(8 marks)

- 1 The scientific term that expresses the strength and the weakness of sound is
- (a) the frequency of sound. (b) the pitch of sound.
(c) the quality of sound. (d) the intensity of sound.
- 2 The colour of the seven spectrum colours, has the lowest deviation.
- (a) violet (b) green
(c) red (d) yellow
- 3 The angle between the emergent light ray and the normal at the point of emergence on the interface, is called the angle of
- (a) incidence. (b) reflection.
(c) refraction. (d) emergence.
- 4 All the following are factors affecting sound intensity, except
- (a) The amplitude of the sound source.
(b) the medium density.
(c) the frequency of the sound wave.
(d) the wind direction.

B Give a reason for the following :

(2 marks)

Light can travel through space.

.....

.....

Answers of Test

1

A 1 (a)

2 (c)

3 (a)

4 (c)

B Because dolphins produce ultrasonic waves, while the human ears can't hear sounds of frequencies more than 20 kilohertz.

Answers of Test

2

A 1 (b)

2 (d)

3 (c)

4 (b)

B Because the light of the Sun consists of seven colours which are called spectrum colours.

Answers of Test

3

A 1 (c)

2 (b)

3 (b)

4 (c)

B They are sound waves of frequencies lower than 20 Hz.

Answers of Test

4

A 1 (c)

2 (a)

3 (c)

4 (b)

B The white light ray is analyzed into seven colours.

Answers of Test

5

A 1 (d)

2 (c)

3 (d)

4 (c)

B Because it is an electromagnetic waves which do not need a medium to travel through.

Properties of Sound Waves**Worksheet****6****1. Complete the following statements :**

1. The human ear can differentiate between the sounds through different factors which are sound, sound and sound
2. Sound is produced due to *(Al-Shrouk Zone / Cairo 2022)*
3. Sound waves are waves which travel through air as pulses of and
4. The voice of lion is pitch than that of sparrow.
5. The frequency of the vibrating string is proportional to its length.
6. Musical tone is a sound of frequency and it is produced from and

2. 1. If the frequency of sound produced from Savart's wheel is 1000 Hertz, when the metallic plate touches the teeth of a certain gear. Find the number of teeth of such gear if the wheel makes 250 rotations in one and a half minute.

.....
.....

2. A tuning fork produces a sound wave of frequency 512 Hz, if its wavelength is 65 cm , calculate the velocity of sound through air in metre/sec.

.....
.....

3. What is meant by ...?

1. Sound pitch.

(Menofia 2019)

.....
.....

2. The wavelength of a sound wave equals 3 cm.

(Omar Al-farouk, sch. / Sharkia 2019)

.....
.....

3. Sound velocity.

.....
.....

4. A. Give reasons for :

1. We hear sound from all directions that surround the sound source.

(Al-Montazah Zone / Alex. 2022)

2. The violin's player changes the length of strings during his play.

B. You have three gears in Savart's wheel shown in the table. Answer the following : By rotating them and touching each with a metallic plate.

1. The sharp sound is produced from touching
the plate to the gear

The gear no.	A	B	C
No. of teeth	20	40	60

2. Adham has run the wheel to 540 cycles/min. and the half of the frequency equals
180 Hz. Which gear has Adham touched with the plate ?

Worksheet

7

1. Write the scientific term :

- The measuring unit of sound intensity. (Gharbia 2022) (.....)
- The intensity of sound at a point varies inversely with the square
of the distance between that point and the sound source. (Menofia 2019) (.....)
- The characteristic by which the ear can distinguish strong
or weak sounds. (.....)
- The measuring unit of noise intensity. (.....)

2. A. Choose the correct answer :

1. All of the following are factors affecting sound intensity, except the
- amplitude of vibration.
 - medium density.
 - frequency.
 - wind direction.

(Dokki Zone / Giza 2019)

2. The intensity of sound in the presence of carbon dioxide as a medium for sound
travels is that in the presence of air.
- equal to
 - higher than
 - lower than
 - half of
3. The intensity of sound when the direction of sound waves propagation is in
the opposite direction of wind.
- decreases
 - increases
 - doesn't change
 - double

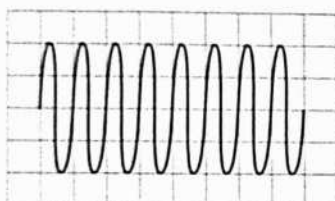
B. Give reasons for :

1. The intensity of sound increases when the sound source touches a resonance box.
.....
2. The intensity of sound decreases as the distance between the ear and sound source increases.
.....
.....

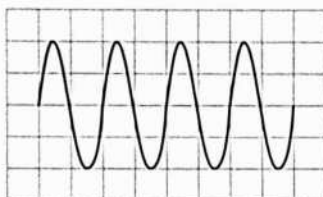
3. Mention the relationship between each of the following :

1. The sound intensity and the amplitude of vibration of the sound source.
.....
2. The intensity of sound and the density of the medium through which the sound passes.
.....

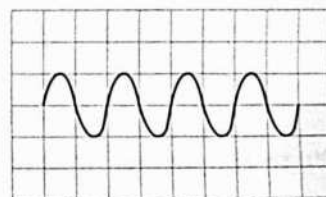
4. Using the following figures, compare from the point of view of sound intensity and pitch between :



Wave (A)



Wave (B)



Wave (C)

1. Sound wave (A) and sound wave (B).
.....
.....

2. Sound wave (B) and sound wave (C).
.....
.....

Worksheet

8

1. A. Put (✓) or (✗) :

1. Ultrasonic waves have frequencies less than 20 Hz. ()
2. Sound of frequency 25000 Hz is audible sound. ()
3. Bats, dogs and dolphins can hear ultrasonic waves. (Heliopolis Zone / Cairo 2022) ()

B. What is meant by ...?

1. Sonic waves. (Dakahlia 2019)
.....
2. Sound quality.
.....

2. You have several resonating sources with different frequencies :

These sources are arranged ascendingly according to their frequencies in the following table :

Resonating source :	1	2	3	4
Its frequency (vibrations/sec.) :	10	50	10000	30000

1. You can hear sound waves produced from vibration of sources :

[(1 , 2) , (2 , 4) , (1 , 4) , (2 , 3)] (Choose one answer)

2. The waves used in food sterilization is produced from source(s) :

[(1 , 2) , (2 , 3) , (4 only) , (3 , 4)] (Choose one answer)

3. Does any of these waves travel through free space ? Why ? (Answer)

.....

4. The waves that are produced from the vibration of the vibrating sources are called :

a. Sonic in case of (Complete)

b. Ultrasonic in case of

c. Infrasonic in case of

3. Give reasons for :

1. Dogs can hear all sounds produced by man.

.....
.....

2. The piano sound differs from that of violin sound even if they have the same intensity and pitch.

(El-Minia 2019)

.....
.....

3. The importance of ultrasonic waves.

.....

4. A person stands near an apparatus producing different sounds of different frequencies as follows :

(12 Hz , 15 Hz , 35 Hz , 50 Hz , 1000 Hz , 15000 Hz , 20000 Hz , 25000 Hz).

Which of these sounds will be heard by such person ? Why?

.....
.....

1. What is meant by ...?

1. Speed of light.

(Al-Agamy zone / Alex, 2019)

2. Light.

3. Visible light.

(Dokki zone / Giza 2019)

2. A. Give reasons for :

1. The energy of red light photon is less than that of orange light photon. (Menofia 2019)

2. Light can travel through free space.

(Damietta 2019)

B. Mention the uses of light ?**3. Choose the correct answer :**

1. Light waves are waves.

(Qaliubya 2019)

a. mechanical transverse

b. electromagnetic transverse

c. electromagnetic longitudinal

d. mechanical longitudinal

2. The quantum of energy of green light is the quantum of energy of yellow light.

a. greater than

b. equal to

c. less than

d. half

(Ismailia 2022)

3. All of the following are from the characteristics of the red colour in spectrum colours, except

a. it has the lowest frequency.

b. its photon energy is the smallest one.

c. its photon has the highest deviation.

d. it has the longest wavelength.

4. Energy of the photon equals
- Planck's constant + Frequency.
 - Planck's constant \div Frequency.
 - Planck's constant \times Frequency.
 - Planck's constant – Frequency.
5. scientist proved that the energy of light waves is composed of photons.
- Isaac Newton
 - Kepler
 - Al-Hassan Ibn El-Haitham
 - Max Planck

Worksheet 10

1. Compare between : transparent medium and translucent medium : (Ismailia 2019)

Points of comparison	Transparent medium	Translucent medium
• Definition :
• Examples :

2. Write the scientific term :

- A medium doesn't allow light rays to penetrate through. (Omar Al-Farouk / Sharkia 2019)
(.....)
- The light intensity of a surface is inversely proportional to the square of the distance between the surface and the source of light. (6th of october / Giza 2019)
(.....)
- The quantity of light falling perpendicular to a unit area of a surface in one second. (Qalyoub Zone / Qalyoubia 2022) (.....)

3. Put (✓) or (✗) :

- The light travels in curved lines through transparent medium. ()
- By increasing the thickness of the transparent medium, the quantity of light that passes through it increases. ()
- Carton and human skin are examples of opaque medium. ()

4. Give reasons for :

1. The inability to see the impurities present in black honey.

.....

.....

2. The intensity of light on a surface decreases to its quarter when the distance between the light source and this surface is doubled.

.....

.....

3. The clothes pins can be seen clearly before and after placing them in a transparent plastic bag.

.....

.....

4. Carton is an opaque medium.

.....

.....

Worksheet**11****on Lessons 1 & 2 Unit Two****1. Complete the following :**

1. The energy of the photon is proportional to the of light wave.
2. waves are audible sounds.
3. White light consists of a mixture of seven colours which are known as
4. High pitch sounds have relatively large and small (Qena 2019)
5. By increasing the speed of rotation in Savart's wheel the frequency , and the sound becomes

2. A. Calculate the number of the gear teeth of Savart's wheel, given that the frequency of the sound produced is 100 Hz and the wheel rotates 30 cycles/min.(6th of october directorate / Giza 2019)

.....

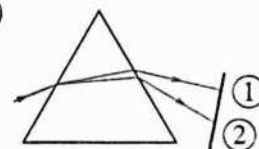
.....

.....

B. In the opposite figure :

(Al-Shrouk Zone / Cairo 2022)

Which ray represents the red colour and
which ray represents the violet colour ?



.....

.....

3. A. Choose the unsuitable word, then express the rest of the words with something proper.

1. Yellow / Blue / White / Violet.

(Deirnwass Official Sch. / El-Menia 2022)

.....

2. Violin / Drill / Piano / Reed pipe.

.....

B. Put (✓) or (✗), then correct what is wrong :

1. The sound velocity through liquids is less than that through gases. ()

.....

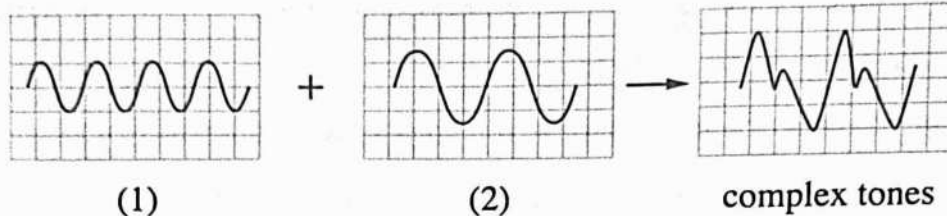
2. Light travels through transparent media in the form of straight lines. ()

.....

3. Sound wave of frequency 15000 Hz is audible sound. ()

.....

4. The following figures shows the formation of complex tones. Which of the two figures (1) , (2) represents the fundamental tone and which one represents the harmonic tone. (give a reason).

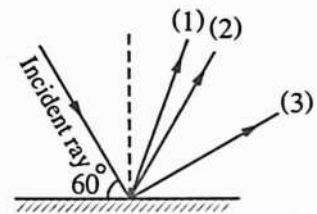


1. A. Write the scientific term :

1. A smooth or rough surface at which the reflection of light takes place. (.....)
2. The angle between the incident ray and the line perpendicular to the reflecting surface at the point of incidence. (.....)

B. From the opposite figure, answer the following :

1. The reflected ray is number
2. The angle of reflection =



2. A. What is meant by ...?

1. Light reflection.

.....

2. Angle of reflection.

(Cairo 2019)

.....

B. Study the following figures, then answer the questions :

1. Find the value of the angle of incidence and the angle of reflection in each of the following cases :

(Ismailia 2022)

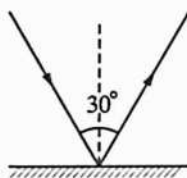


Fig. (1)

.....
.....

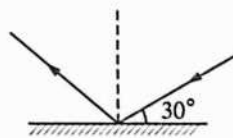


Fig. (2)

.....
.....

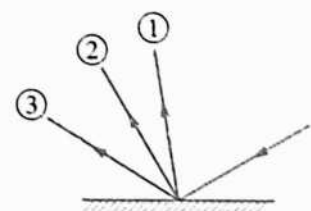


Fig. (3)

.....
.....

2. Which of the following reflected rays represents the reflected ray in the right direction and why ?

.....
.....



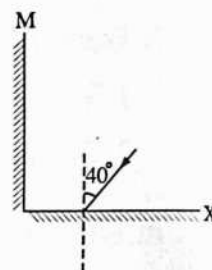
3. A. State the two laws of light reflection :

(Borg Al-Arab Zone / Alex. 2022)

- * First law :
- * Second law :

B. Choose the correct answer :

1. If the angle between the incident ray and the reflecting surface is 60° , then the angle between the incident and the reflected rays will be
 a. 30° b. 60° c. 15° d. 120°
2. In the opposite figure, when a ray of light falls on the mirror (X) by an angle 40° , the reflected ray will fall on the surface of the mirror (M) by angle of incidence equals
 a. 30° b. 60° c. 40° d. 50°



4. What happens when ... ?

1. A light ray falls perpendicular on a reflecting surface. Why ? (New Cairo zone / Giza 2019)

2. Incidence of light rays on a rough surface. (Ismail-El-Habrouk sch. / Behira 2019)

Worksheet 13

1. A. Give reasons for :

1. The light refracts when it travels from a transparent medium to another of different optical density.

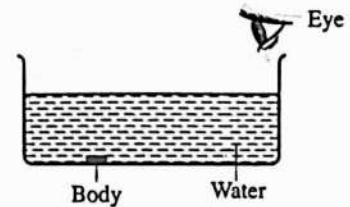
2. The absolute refractive index of any transparent medium is larger than one.
 (Al-Mostakbal Modern sch. / Giza 2019)

3. A coin in a glass of water appears in a position higher than its true position.

B. Complete the following :

1. When a light ray travels from a transparent medium of higher optical density to another of lower optical density, the angle of is more than the angle of
2. Light is the change of light path when it travels from a transparent medium to another one of different
(Qena 2019)

2. A. Show by drawing the path of the ray by which the eye can see the body.

**B. Choose the correct answer :**

A hunter standing on the shore of the sea, he wants to catch fish under water surface, so he should direct the arrow

- | | |
|--------------------------------|---------------------------------|
| a. to the body of the fish. | b. above the body of the fish. |
| c. below the body of the fish. | d. beside the body of the fish. |

3. What happens when ...?

1. A light ray falls perpendicular to the interface between two transparent media of different optical densities.
(El-Agamy zone / Alex. 2019)

.....
.....

2. You look at a pencil partially immersed in a cup of water. Why ? (Dokki zone / Giza 2019)

.....
.....

4. A. Write the scientific term :

1. A natural phenomenon that takes place on desert roads at noon in summer times.
(Al-Mostakbal sch. / Giza 2019) (.....)
2. The ability of the transparent medium to refract the light.
(.....)
(Helwan Zone / Cairo 2022)
3. The angle between the emergent light ray and the normal at the point of emergence on the interface.
(El Sahel Zone / Cairo 2022) (.....)

B. What is meant by ...?

1. The absolute refractive index of water is 1.3
(East Zagazig zone / Sharkia 2019)

.....
.....

2. The angle of refraction.

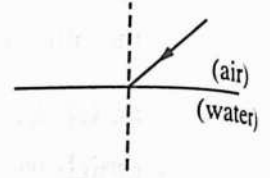
(Dakahlia 2019)

.....

.....

C. Complete the opposite figure, then answer the following :

1. The light ray refracts the normal.
2. The angle of is greater than the angle of



General Exercise of the School Book



on Unit Two

1. Write the scientific term :

1. Sound waves of frequencies less than 20 Hz. (.....)
2. A medium does not allow light rays to penetrate throw. (.....)
3. Changing the path of light when travel from a transparent medium to another transparent medium of different optical density. (.....)

2. Choose the correct answer, with the scientific explanation :

1. Sound of frequency 200 Hz is than sound of frequency 100 Hz.
a. sharper b. stronger c. harsher d. weaker
.....
.....
2. When the distance between the source of light and the surface as a wall decreases, the light intensity on the surface
a. decrease. b. increases. c. doubled. d. remains constant.
.....
.....

3. Write down the mathematical relation that joins between each of the following :

1. The photon frequency and its energy.
.....
2. The sound frequency (F), the number of teeth of the gear in Savart's wheel (n).
.....

4. What are the results due to each of the following ... ?

1. Incidence of light rays on a rough surface.
.....
.....
2. Incidence of a white light ray on one face of a triangular glass prism.
.....
.....

5. What is the scientific basis on which the following depends ?

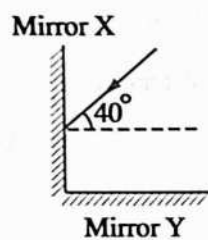
The strings of a musical lute are fixed on a hallow wooden box.

.....

.....

6. Complete the path of rays in each of the following figures according to what is written below each :

A.

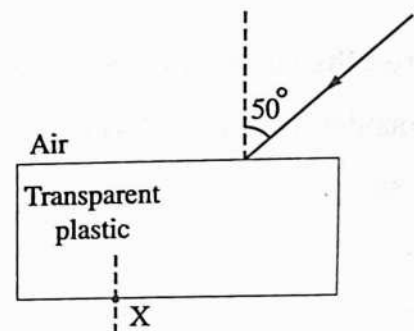


Determination of the angle of reflection of the ray on mirror (Y).

.....

.....

B.



Calculating the angle of emergence from point (X) given that the optical density of air is less.

.....

.....

Model Exam

1

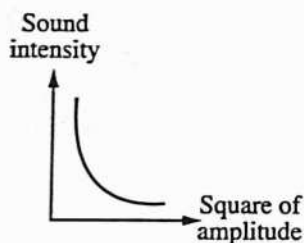
56

Answer the following questions :

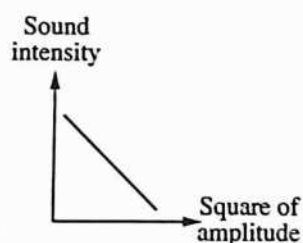
Question 1 14 marks

A Choose the correct answer :

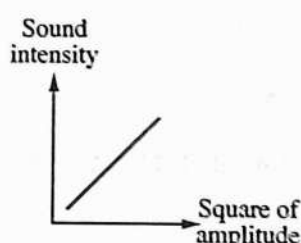
- The substance that a sound wave travel through is called the
a. medium. b. vacuum. c. rarefaction. d. mediary.
- The angle of incidence of light is its angle of reflection.
a. larger than b. smaller than c. equal to d. double to
- The human skin is considered as a/an medium.
a. transparent b. semi-transparent c. opaque d. translucent
- The figure represents the relation between the intensity of sound and the square of amplitude of vibration of a vibrating body.



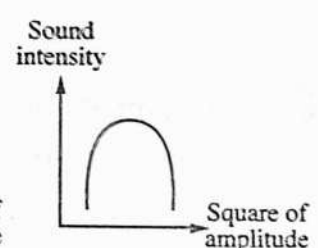
a.



b.



c.



d.

B Put (✓) or (✗) :

- When light ray travels from air to water it reflects. ()
- The fish is seen higher than its real position in the fish tank. ()

(Qeft Educational Administration / Qena 2019)

- Bats, dogs and dolphins can hear ultrasonic waves. ()

(Port Said Educational zone, 2019)

- Wood doesn't allow the passage of light through it. ()

(Belkas Administration / Dakahlia 2019)

C Give a reason for :

The pencil which is partially immersed in water, appears as being broken.

.....

.....

Question 2 14 marks

A Write the scientific term :

1. A tone of regular frequency that is produced from reed pipe. (.....)
2. The ability of the medium to refract light rays. (.....)

(El-Gomrok zone / Alex. 2019)

3. Seven colours are produced as a result of splitting of the white light. (.....)
4. A property by which the human ear can distinguish between strong and weak sounds.

(6th of October directorate / Giza 2019) (.....)

B From the opposite figure :

1. What is the type of slide that placed over the image ?
.....
2. Explain why, we can't see the part present below (X) clearly ?
.....



C What is meant by ...?

The angle of reflection of light ray = 30°

.....

Question 3 14 marks

A Correct the underlined words in the following statements :

1. The produced tone from a tuning fork is called complicated tone. (.....)

(Patriarchal college / Cairo 2019)

2. Sonic waves are used in sterilization of milk. (.....)

(6th of October / Giza 2019)

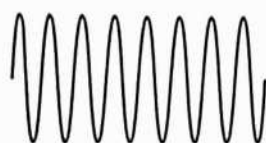
3. White light travels in curved lines. (.....)

(6th of October directorate / Giza 2019)

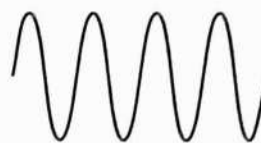
4. The absolute refractive index is equal to one. (.....)

(El-Gomrok zone / Alex. 2019)

- B** Compare between the two waves (A) , (B) in terms of pitch (Give a reason).



Wave (A)



Wave (B)

The sound pitch of wave is higher than the sound pitch of wave

Because :

- C** What is the importance of Savart's wheel ?

(El-Agamy zone / Alex. 2019)

.....

Question 4 14 marks

- A** Cross the odd word out, then write the scientific term of the rest words :

1. Yellow / Blue / White / Violet / Red. (.....) (.....)
2. Glass / Ceramic / Air / Water. (.....) (.....)
3. Milk / Cotton / Air / Human skin. (.....) (.....)
4. Sound wave its (F) = 100 Hz / Sound wave its (F) = 1KHz / Sound wave its (F) = 40 Hz / Sound wave its (F) = 10 Hz. (.....) (.....)

(Ismail El-Habrouk formal sch. / El-Behira 2019)

- B** What does these relations indicate ?

1. $\frac{\text{Velocity of wave propagation}}{\text{Wave frequency}}$ (Patriarchal college / Cairo 2019) (.....)
2. Planck's constant \times Photon frequency. (Patriarchal college / Cairo 2019) (.....)
3. Sound intensity (I) $\propto \frac{1}{\text{Square of the distance between the ear and the sound source (d}^2\text{)}}$ (.....)
4. $\frac{\text{Velocity of light through air}}{\text{Velocity of light through glass}}$ (.....)

- C** Savart's wheel rotates with a rate of 300 cycles per minute, a sound of frequency 600 Hz is produced when an elastic plate touches the teeth of one gear, calculate the number of teeth of the gear.

(Al-Shaheed Sheriff Talat Sch. / El-Sharkia 2022)

Answer the following questions :

Question 1 14 marks

A Complete the following statements :

1. The light reflection is classified into two types which are and
2. Sounds of different musical instruments can differentiated from each other by
3. When you look at a coin in a glass of water, its position appears to be lower than the position.
4. The light intensity is the amount of light

B Mention an example for :

1. Mechanical longitudinal wave. (.....)
2. Regular reflection. (El-Gomrok zone / Alex 2019) (.....)
3. Transparent medium. (El-Agamy zone / Alex 2019) (.....)
4. An opaque medium. (.....)

C Mention two factors only affecting the sound intensity.

(Cairo 2019)

.....

.....

.....

Question 2 14 marks

A Choose from column (B) what suits it in column (A) :

(Borg Al-Arab Zone / Alex 2022)

(A)	(B)
1. The sound pitch	a. is the characteristic, by which the ear can differentiate between the sounds as strong or weak.
2. The quality of sound	b. is the property, by which the ear can distinguish between sharp and rough sounds.
3. The sound intensity	c. is the number of the complete vibrations in one second.
	d. is the characteristic, by which the ear can distinguish between sounds from different sources even if they are equal in intensity and pitch.

1.

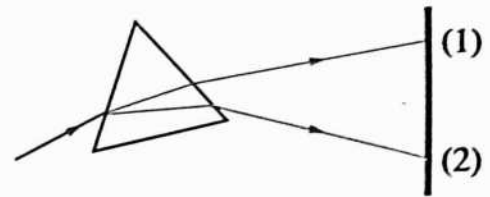
2.

3.

B In the opposite figure :

1. Which ray represents the red colour and which ray represents the violet colour ?

(Al-Shrouk Zone / Cairo 2022)



2. Which one has a greater energy, the photon of red light or the photon of violet light ?

C Compare between regular reflection and irregular reflection. (definition only)

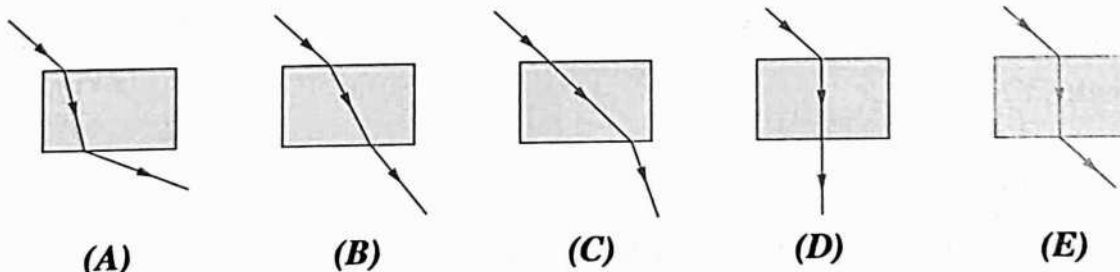
(El Sayeda Khadija Sch. / Cairo 2022)

Question 3 14 marks

A Put (✓) or (✗) :

- As the length of the vibrating string decreases, the frequency of the produced sound increases. ()
- Sound wave of frequency 25000 Hz is audible sound. ()
- Light intensity of a surface decreases as the distance between the surface and the light source increases. ()
- The light ray refracts near to the normal when it travels from air to glass. ()

B Choose from the following figures the one that expresses correctly the refraction of light in a rectangular glass block and mention the reason.



C Calculate the absolute refractive index of water, knowing that the velocity of light through water is 2.25×10^8 m/s and the velocity of light through air is 3×10^8 m/s.

Question 4 14 marks**A** Study the given table and answer the following questions :

Area	Waves
3	Ultrasonic waves
2	Sonic waves
1	Infrasonic waves

1. Complete the following :

(1) The frequency of point (X) is Hz.

(2) The frequency of point (y) is Hz.

2. Choose :

(1) Frequency is in area (1).

a. 15 Hz

b. 22 Hz

c. 2000 Hz

d. 25000 Hz

(2) Frequency is in area (2).

a. 15 Hz

b. 22 Hz

c. 25000 Hz

d. 30000 Hz

(3) Frequency is in area (3).

a. 15 Hz

b. 22 Hz

c. 2000 Hz

d. 25000 Hz

(4) Dogs and dolphins can hear waves.

a. infrasonic

b. sonic

c. ultrasonic

d. (b) and (c)

(5) Bats can hear waves.

a. infrasonic

b. sonic

c. ultrasonic

d. (b) and (c)

(6) Medical diagnosis instruments are made by using waves in area.

a. first

b. second

c. third

d. (a) and (b)

B From the opposite figure, complete the following statements :

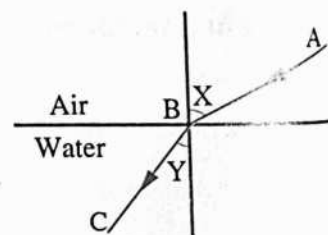
(Gharbia 2022)

1. The ray (AB) represents

2. The ray (BC) represents

3. Angle (X) is

4. Angle (Y) is

**C** Give a reason for :

Occurrence of mirage phenomenon in desert regions at noon.

(Ismailia 2019)

April Tests

Model 1

Total mark _____

10

Question 1 5 marks

A Choose the correct answer :

- If the distance between a surface and light source decreases to its half, the light intensity of the surface
 - decreases to its one fourth.
 - decreases to its half.
 - increases twice.
 - increases four times.
- The floral whorl, which is absent (not found) in the female flower is the
 - calyx.
 - corolla.
 - androecium.
 - gynoecium.
- If the frequency of red colour is 4×10^{12} Hz, the frequency of violet colour is $\times 10^{12}$ Hz.
 - 1.5
 - 3.5
 - 4
 - 7.5
- If the angle between a reflected light ray and a reflecting surface is 30° , so the angle of reflection will be equal to
 - 15°
 - 30°
 - 60°
 - 90°

B What is meant by ...?

The velocity of light is 3×10^8 m/sec.

.....

.....

.....

Question 2 5 marks**A** Put (✓) or (✗) :

1. Auto (Self) pollination occurs in barely plant. ()
2. Reflection of light from rough surfaces is called regular reflection. ()
3. Vegetative reproduction is a kind of sexual reproduction. ()
4. When light ray travels from air to water, the angle of incidence is greater than the angle of refraction. ()

B Give a reason for the following :

The stigmas of air pollinated flowers are feathery like and sticky.

.....

.....

.....

Model 2

Total mark

10

Question 1 5 marks**A** Choose from column (B) what suits it in column (A).

(A)	(B)
1. Androecium	a. is the change of the path of light ray when it moves between two media with different optical densities.
2. Light reflection	b. is the male organ in a flower.
3. Gynoecium	c. is the change in the direction of light ray in the same medium, when it falls on a reflecting surface.
4. Light refraction	d. protects the inner parts of a flower.
	e. is the female organ in a flower.

1.

2.

3.

4.

B What happens if ... ?

A compact disc (CD) with shiny side is put to face sunlight.

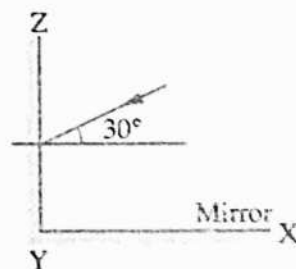
.....

.....

.....

Question 2 5 marks**A** Write the scientific term of each of the following :

1. A physical quantity equals Plank's constant is multiplied by frequency. (.....)
2. A group of flowers found on the same axle. (.....)
3. The position, at which the submerged object in water is seen slightly above its real position. (.....)
4. The reproduction of some plants by parts of the roots, stems or leaves. (.....)

B Complete the following figure after redrawing it in your answer sheet, then write the name of each ray :

Revision on lesson one

1. Choose the correct answer:

1. A sound travels in air with velocity 330metre/sec. and has a wavelength 0.1metre, its frequency equals.....

- a. 330Kilohartz b. 3300Hertz c.33Kilohertz d.330hertz

2. Sound of frequency 200Hz is than the sound of frequency 100Hz.

- a. stronger b. sharper c. weaker d. harsher

3. All of the following are factors affecting sound intensity, except the

- a. amplitude of vibration b. medium density
c. frequency d. wind direction.

4. The human ear can distinguish sounds of frequency.....

- a. 50KHz b. 30KHz c.300Hz d.5 Hz.

2) Give Reason for:

1. Sound travelling in air has less intensity than that travelling in carbon dioxide.

.....
.....

2. The intensity of sound decrease as the amplitude of vibrating source decrease.

.....
.....

3. We hear sound from all direction that surround the sound source.

.....
.....

3) Write the scientific term:

1. The measuring unit of sound intensity. ()
2. The intensity of sound at a point varies inversely with the square of the distance between that point and sound source. ()

4) Savart's wheel rotates with a rate of 300 cycles per minute. A sound of frequency 600Hz is produced when an elastic plate touches the teeth of one gear. Calculate the number of teeth of the gear.

Revision on lesson two

1)choose the correct answer:

1. Light waves are Waves.
 - a. mechanical transverse
 - b. electromagnetic transverse
 - c. electromagnetic longitudinal
 - d. mechanical longitudinal
2. Photon energy = plank's constant *
 - a. Photon frequency
 - b. photon wavelength
 - c. amplitude.
 - d. photon velocity.
3. The human skin is considered as a/an medium.
 - a. transparent
 - b. opaque
 - c. transverse
 - d. semi-transparent
4. Light travels in lines.
 - a. curved
 - b. circular
 - c. straight
 - d. zigzag
5. When the distance between the source of light and the surface of a wall decreases, the light intensity on the surface.....
 - a. decrease
 - b. increase
 - c. is doubled
 - d. remains constant

2)Write the scientific term of each of following

1. The main source of light energy on the Earth's surface. ()
2. A mixture of seven spectrum colours. ()
3. The colour which has the highest frequency, shortest wavelength ()
4. A medium doesn't allow light rays to penetrate through. ()

Give reason for:

1. The energy of red light photon is less than that of orange light photon.
.....
2. A clear glass is a transparent medium.
.....
3. A tissue paper is a transparent medium.
.....
4. The in ability to see the impurities present in black honey
.....

Revision on lesson three

Write the scientific term:

1. The reflection in which the light rays recoil in many directions when falling on a rough surface. ()
 2. The angle between the reflected light ray and the normal at the point of incidence on the separating surface. ()
 3. The ability of the medium to refract light rays. ()
 4. Changing the path of light when it travels from a transparent medium to another transparent medium of different optical density. ()
 5. The ratio between the velocities of light through air to the velocity of light through transparent medium. ()
-

Complete the following:

1. when a light ray travels from a transparent medium of higher optical density to another of lower density, the angle of..... is more than the angle of
 2. Light is the change of light path when it travels from a transparent medium to another one of different.....
-

Give reason for:

1. The light that falls perpendicular on a glistening surface reflects on itself.

.....

2. When the light ray travels from air to water it refracts near to the normal.

.....

3. Occurrence of mirage phenomenon in desert regions at noon.

.....

What happen if..?

1. A light ray falls perpendicular to the interface between two transparent media of different optical densities.

.....

Problems:

1. if the angle between the incident light ray and the reflected light ray is 140° , find the angle of incidence and the angle of reflection.

.....

2. calculate the absolute refractive index of diamond given that the speed of light through it is $1.25 \times 10^8 \text{ m/s}$. (knowing that the velocity of light through air is $3 \times 10^8 \text{ m/s}$)

Revision on unit two

1) write the scientific term:

1. Sound waves of frequencies less than 20Hz. ()
2. A medium does not allow light rays to penetrate through. ()
3. Changing the path of light when travel from a transparent medium to another transparent medium of different optical density. ()

2) choose the correct answer:

1. Sound of frequency 200Hz is than sound of frequency 100Hz.
a. sharper b. stronger c. harsher d. weaker
2. When the distance between the source of light and the surface as a wall decreases , the light intensity on the surface.....
a. decrease b. increase c. doubled d. remains constant

3) write down the mathematical relation that joins between each of the following:

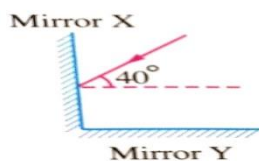
1. The photon frequency and its energy.
.....
2. The sound frequency (F), the number of teeth of each of the gear in savart's wheel (n).
.....

4) what are the results due to each of the following...?

1. Incidence of light rays on a rough surface.
.....
2. Incidence of a white light ray on one face of a triangular glass prism.
.....

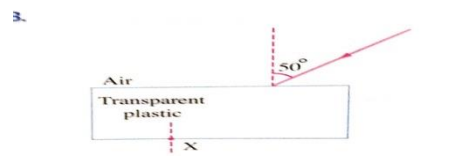
5) complete the path of rays in each of the following figures according to what is written below each:

A)



Determination of the angle of reflection
of the ray on mirror (Y)

B)



calculate the angle of emergence
from point (X)

Worksheet

Q.(1): Give reasons:

1. The ultrasonic waves are used in milk sterilization?
2. The piano sound differs from the violin sound even if they have the same pitch and intensity?
3. Sound traveling in air has less intensity than that traveling in carbon dioxide?

Q.(2): What's meant by:

1. The wavelength of a sound wave is 1.5 m?
2. Sound intensity?
3. Sound quality?

Q.(3): Answer the following question:

1. Savart's wheel rotate with a rate 300 cycles per minute. A sound with frequency 600 Hz is produced when an elastic plate touches the teeth of the gear. Calculate the number of the teeth of the gear?
2. Calculate the number of teeth of savart's wheel, given that the frequency of the sound produced is 100 Hz and the wheel rotates 30 cycles/min?
3. A sound source produces 3600 cycles in 3 minutes. If its wavelength is 17 meters. Find the velocity of the sound wave?

You can if you think that you can
Believe in yourself



Worksheet 4

1-Complete the following statement:

- 1-Light is.....waves that travel through free space.
- 2-Light travels through the Media inlines.
- 3-The light velocity is the distance
- 4-Light waves consists of and.....
- 5-The light intensity is the amount of light

2-Give reason for:

- 1-formation of spectrum colors?
- 2-A clear glass is a transparent medium?
- 3-The light of the sun is complex light?
- 4-Light can travel through free space?
- 5-wood is opaque medium?

Dream it! Wish it! Do it!



Worksheet 5

Q.(1) Answer the following questions:

1. Calculate the absolute refractive index of diamond given that the speed of light through it 1.25×10^8 m/s, and the velocity of light in air is 3×10^8 m/s?
2. Calculate the velocity of light in glass if the velocity of light in air is 3×10^8 m/s and the refractive index of glass is 1.5?

Q.(2): Give reasons:

1. The absolute refractive index of any transparent media is greater than 1?
2. The floor of the swimming pool appears higher than its original position?
- 3-when a light ray passes through a glass prism, it refracts?

Q.(3): Define:

- 1-Angle of refraction.
- 2-Mirage phenomenon.
- 3-Light refraction.

Everything is possible ❤️



March Revision

Mr. Ahmed ElBasha

✱ **(1) Write the scientific term:**

- 1 The distance covered by the wave in one second. (.....)
- 2 Non-audible waves whose frequencies are less than 20 Hz. (.....)
- 3 The measuring unit of noise intensity. (.....)
- 4 The ability of the medium to refract light. (.....)
- 5 It is an external stimulus that affects the ear and causes hearing. (.....)
- 6 A tool is used to determine the pitch of an unknown tone. (.....)
- 7 The amount of light that falling perpendicular to a unit area of a surface in one second. (.....)
- 8 The measuring unit of sound intensity (.....)
- 9 The angle between the emergent light ray and the normal. (.....)
- 10 Angle of incidence= Angle of reflection (.....)
- 11 A property by which the human ear can distinguish between strong and weak sounds. (.....)
- 12 Rebouncing of light waves in the same medium due to meeting a reflecting surface. (.....)
- 13 An angle between the incident light ray and the normal at the point of incidence on the interface. (.....)
- 14 Bodies don't allow the passage of light through them. (.....)
- 15 Waves of frequencies ranging from 20 Hz to 20000 Hz. (.....)
- 16 The scientist who discovered that the energy of photon depends on its frequency. (.....)

- 17 The distance that a wave travels in one second. (.....)
-
- 18 The product of Planck's constant times the frequency of photon. (.....)
-
- 19 The waves which need a medium to propagate. (.....)
-
- 20 The reflection in which the light rays recoil in many directions, when falling on a rough surface. (.....)
-
- 21 A phenomenon that appears in the desert as a result of reflection and refraction of light. (.....)
-
- 22 The property by which the ears can distinguish between sounds with respect to the nature of the source even if they are equal in pitch and intensity. (.....)
-
- 23 The angle between the reflected ray and the normal at the incidence point on the reflecting surface. (.....)
-
- 24 The ability of the medium to refract light rays. (.....)
-
- 25 Sound waves their frequency is more than 20000 Hz. (.....)
-

***(2) Choose the right answer:**

1. All the following are from the factors affecting sound intensity except the
a. amplitude. b. frequency. c. density of medium. d. wind direction.
2. The quantum of energy of green light is the quantum of energy of yellow light.
a. greater than b. equal to c. less than d. no correct answer
3. Sound of frequency 200 Hz is than the sound of frequency 100 Hz.
a. sharper b. stronger c. harsher d. weaker
4. The absolute refractive index of water is
a. 0.5 b. 0.8 c. 0.33 d. 1.33
5. When the incident light ray reflects on itself, the angle of incidence equals
a. 0° b. 90° c. 120° d. 180°
6. The human ear can distinguish sounds of frequency
a. 50 KHz. b. 30 KHz. c. 300 KHz. d. 50 Hz.
7. The color light in the spectrum colours has the highest deviation.
a. white b. red c. violet d. yellow
8. The photon energy= Plank's constant x
a. wavelength. b. velocity. c. amplitude. d. frequency.
9. The sound of frequency 500 Hz is than the sound of frequency 100 Hz.
a. stronger b. sharper c. weaker d. harsher
10. The angle of incidence of light is its angle of reflection.
a. larger than b. smaller than c. equal to d. no correct answer
11. If the angle between the incident light ray and the reflected light ray is 30° so, the angle of reflection is
a. 30 b. 15 c. 60 d. 40
12. All of the following are factors affecting sound intensity except
a. amplitude of vibration. b. frequency.
c. medium density. d. wind direction.
13. The submerged object in water as a fish is seen in an apparent position slightly above its real position due to of the light rays.
a. refraction b. reflection c. analysis d. total internal reflection
14. White light analyzes into spectrum colours.
a. 3 b. 5 c. 7 d. 9
15. The doctors use waves with a frequency to break down kidney stones.
a. less than 20 Hz b. 20 Hz c. more than 20 KHz

16. The absolute refractive index of any material is always one.

- a. less than b. more than c. equal

17. In reflection, the reflected rays are reflected in many directions.

- a. uniform b. irregular c. both (a) and (b)

18. All of these sounds are of uniform frequency except the sound of

- a. piano. b. violin. c. loudspeakers. d. guitar.

19. The quantum of energy of green light is the quantum of energy of yellow light.

- a. greater than b. equal to c. smaller than d. no correct answer

20. media do not allow light to pass through it.

- a. Transparent b. Translucent c. Opaque d. no correct answer

21. If the angle between the incident light ray and the reflected light ray is 90° , so the angle of reflection will be equal

- a. 0° b. 30° c. 45° d. 90°

22. Doctors use waves of a frequency to break down kidney and ureter stones.

- a. more than 20 Hz b. less than 20 KHz
c. 20 Hz d. more than 20 KHz

23. The human skin is considered as a/an medium.

- a. transparent b. opaque c. translucent d. no correct answer

24. A pencil seems broken when it is placed in a glass cup of water due to of light.

- a. critical angle b. mirage c. refraction d. reflection

25. A natural phenomenon takes place on the desert roads at noon due to reflection and refraction of the light

- a. lightning. b. thunder. c. mirage. d. rainbow.

26. The measuring unit of noise intensity is

- a. Hertz. b. Watt/m^2 . c. Cycles/sec. d. Decibel.

27. We can hear all of the following sounds except

- a. 40 Hz. b. 60 KHz. c. 10 KHz. d. 60 Hz.

28. Sound of different musical instruments can be differentiated from each other by

- a. harmonic tones. b. fundamental tone.
c. sound intensity. d. sound pitch.

✳(3) Complete the following :

1. Light is waves but sound is waves.
2. is a transparent medium of light but wood is a(an) medium.
3. Sharp tones have frequencies, while rough tones have frequencies.
4. Harmonic tones are lower in and higher in than fundamental tones.
5. The measuring unit of noise intensity is, while the measuring unit of the periodic time is
6. When light travels from a medium of optical density to another of optical density, it refracts far from the normal line.
7. The reflection of light is classified into two types which are and
8. The frequency of sonic waves ranges between Hz to KHz.
9. The voice of women is pitched, while the voice of men is pitched.
10. Waves are classified according to the ability to propagate and transfer energy into and waves.
11. Max Planck proved that the energy of light wave consists of energy quanta known as
12. The glass prism is used to analyses the light into colors.
13. As the amplitude increases, the sound intensity
14. Infrasonic waves are sound waves of frequencies less than Hz.
15. When a light ray falls perpendicular on a reflecting surface the angle of reflection equals
16. color has the longest wavelength, while has the shortest wavelength.
17. When you look at a coin in a glass of water, its position appears to be lower than the position.
18. Sounds can be classified into two groups, musical tones of frequency and noises of frequency.
19. The human skin is considered medium, while pure glass is medium for light.
20. The Sound if from waves that can't travel through.....
21. The high-pitched sound waves have high and small

22. The light velocity is the distance
23. Light travels through the media in lines.
24. From properties of light is that light travels in lines.
25. The angle of incidence the angle of reflection.
26. The sound intensity at a point is proportional to the square of the distance between this and the source of sound.
27. Sound is produced from of bodies.
28. If the angle between the incident light ray and reflected light ray is 100° , so the angle of reflection =
29. In reflection, rays are reflected in one direction.

✱(4) Correct the underlined words:

1	Sound pitch is increased by <u>decreasing</u> the frequency.	(.....)
2	Light propagates in <u>zigzag</u> lines.	(.....)
3	The angle between the incident light ray and the reflected light ray = 100° , so the angle of reflection = <u>60°</u>	(.....)
4	The human skin is considered as <u>translucent</u> medium.	(.....)
5	We see the submerged objects in water in a <u>lower</u> position than its real position	(.....)
6	Changing the light ray path when it faces a transparent object is considered <u>light reflection</u>	(.....)
7	The absolute refractive index of any material is always <u>smaller than one</u>	(.....)
8	<u>Yellow</u> colour is the first colour in spectrum colours.	(.....)
9	<u>Sonic</u> waves are used in sterilization of milk.	(.....)
10	Frequency of infrasonic waves is less than <u>2000</u> Hz.	(.....)
11	Human ear can distinguish between sound of frequencies ranging between <u>10</u> : 20000 Hz.	(.....)
12	The angle of incident of a light ray is <u>greater than</u> the angle of reflection.	(.....)
13	The produced tone from a tuning fork is called <u>complicated tone</u>	(.....)
14	<u>Rainbow</u> phenomenon takes place on desert roads at noon specially in summer.	(.....)
15	The <u>infrasonic</u> waves are used in breaking down kidney stones.	(.....)
16	As the density of medium decreases, <u>amplitude increases.</u>	(.....)
17	Unit of sound intensity is <u>Hertz.</u>	(.....)
18	Harmonic tones companying the fundamental tone lower in <u>pitch.</u>	(.....)
19	Light <u>refraction</u> is rebounding of light wave in the same medium.	(.....)

***(5) Give reason for:**

1. The pen seems broken when it is put in a glass of water.
.....
2. The use of ultrasonic waves in milk sterilization
.....
3. Wood doesn't allow the passage of light through it.
.....
4. When a light ray is incident perpendicular to the reflecting surface, it reflects on itself.
.....
5. The energy of red light photon is less than the energy of violet light photon.
.....
6. Sound travelling in air has less intensity than that travelling in carbon dioxide.
.....
7. Occurrence of mirage phenomenon in desert region at noon.
.....
8. Light can travel through free space.
.....
9. Clear glass is a transparent medium.
.....
10. We see lightning before hearing thunder.
.....
11. The fish in water is seen in an apparent position slightly above its real position.
.....

✱(6) What happen if:

1. Decreasing the amplitude of the sound source to its half (concerning the sound intensity).

.....

2. Incidence of a white light ray on one face of a triangular glass prism.

.....

3. When the distance between the light source and a surface is doubled (concerning the light intensity).

.....

4. When you put a ringing mobile phone on a resonance box (concerning the sound intensity).

.....

5. Incidence of light rays on a rough surface.

.....

6. A light ray falls perpendicular on a reflecting surface.

.....

***(7) Put (\checkmark) or (X) :**

1. The fish is seen higher than its real position in the fish tank. ()
2. The sound intensity decreases, when the source of sound touches an empty box. ()
3. Infrasonic waves are used in breaking down stones of kidney. ()
4. Harmonic tones that accompany the fundamental tone are lower in pitch. ()
5. The measuring unit of sound intensity is decibel. ()
6. The energy of light = Constant x Wavelength. ()
7. The sound intensity decreases when it touches a resonance box ()
8. Light waves are electromagnetic transverse wave. ()
9. Sound intensity increase as amplitude increase. ()
10. Sound can be heard from all directions that surround the sound source ()
11. Sound intensity increases when wind and sound waves are in the same direction ()
12. The absolute refractive index for any transparent medium is less than 1 ()
13. The transverse wave consists of compressions and troughs. ()

✱(8) Problems

1

Calculate the frequency of a musical tone similar to the tone produced from Savart's wheel rotating with a velocity of 960 cycles in two minutes, knowing that the number of gear teeth = 30 teeth.

.....

.....

.....

2

Calculate the speed of light through diamond given that the absolute refractive index of it = 2.4 and the speed of light through air = $3 \times 10^8 \text{ m/s}$.

.....

.....

.....

3

savart's wheel rotates with a rate of 300 cycles per minute. A sound of frequency 600 Hz is produced when an elastic plate touches the teeth of the gear, calculate the number of teeth of the gear.

.....

.....

.....

4

Calculate the number of gear teeth of Savart's wheel, if a musical tone similar to the frequency of an emitted tone = 160 Hz, and Savart's wheel rotated with a velocity of 960 cycles in three minutes.

.....

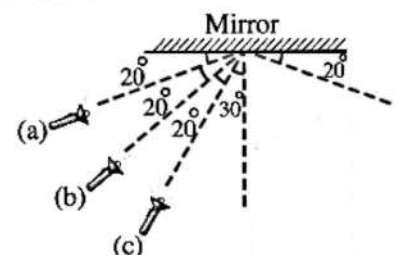
.....

.....

5

The opposite figure represents a torch emits light falls on a mirror :

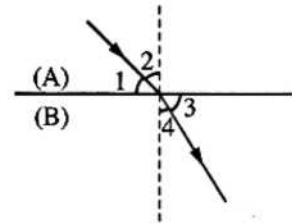
1. Torch represents the following reflection.
2. The angle between the reflected light ray and its incident light ray =
3. Identify the second law of reflection of light.



6

From the opposite figure, find the number that refers to the following :

1. The angle of incidence.
2. The angle of refraction.
3. Which medium (A) or (B) is greater in the optical density ?



7

Complete the opposite figures after redrawing them in your answer sheet then complete the following statements :

1. In fig. (1) the angle of reflection =
2. In fig. (2) the angle of incidence =

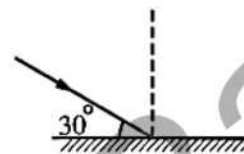


Fig. (1)

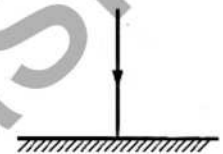
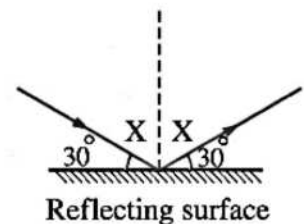


Fig. (2)

8

From the opposite figure :

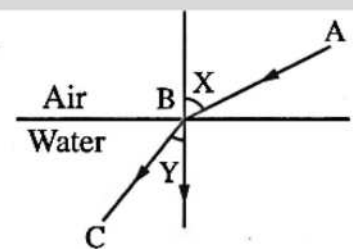
1. Calculate the angles of incidence and reflection.
2. What can you conclude from this figure ?
3. What will happen if this light ray falls perpendicular on the reflecting surface ?



9

From the opposite figure, answer :

1. The ray (AB) represents
2. The ray (BC) represents
3. Angle (X) is
4. Angle (Y) is



Model Answer

*(1) Write the scientific term:

- | | | | |
|------------------------------|------------------------|--------------------------|-------------------------------|
| 1. Wave velocity | 7. Light intensity | 14. Opaque object | 21. Mirage |
| 2. Infrasonic waves | 8. Watt/m ² | 15. Sonic waves | 22. Sound quality |
| 3. Decibel | 9. Angle of emergence | 16. Max blank | 23. Angle of reflection |
| 4. Optical density of medium | 10. First law | 17. Wave velocity | 24. Optical density of medium |
| 5. Sound | 11. Sound intensity | 18. Photon energy | 25. Ultrasonic waves |
| 6. Savart wheel | 12. Light reflection | 19. Mechanical waves | |
| | 13. Angle of incidence | 20. Irregular reflection | |

*(2) Choose the right answer:

- | | | | | | |
|------|-------|-------|-------|-------|-------|
| 1. B | 6. D | 11. B | 16. B | 21. C | 26. D |
| 2. A | 7. C | 12. B | 17. B | 22. B | 27. B |
| 3. A | 8. D | 13. A | 18. C | 23. B | 28. A |
| 4. D | 9. B | 14. C | 19. A | 24. C | |
| 5. A | 10. C | 15. C | 20. C | 25. C | |

*(3) Complete the following:

- | | | | |
|---------------------------------|----------------------------------|------------------------------------|----------------------------|
| 1. Electromagnetic – mechanical | 10. Electromagnetic – mechanical | 18. Uniform – non uniform | 23. Transparent – straight |
| 2. Glass opaque | 11. Photons | 19. Opaque – transparent | 24. Straight |
| 3. High – low | 12. White – seven | 20. Mechanical – vacuum | 25. Equals |
| 4. Intensity – pitch | 13. Increase | 21. Frequency – amplitude | 26. Inversely |
| 5. Decibel | 14. 20 | 22. Covered by light in one second | 27. Vibration |
| 6. Higher – lower | 15. Zero | | 28. 50 |
| 7. Regular – irregular | 16. Red – violet | | 29. Regular |
| 8. 20 – 20 | 17. Real – apparent | | |
| 9. High – low | | | |

*(4) Correct the underlined words:

- | | | | |
|-------------|---------------------|-----------------|-------------------------|
| 1. Increase | 6. Light refraction | 11. 20 | 16. Intensity decrease |
| 2. Straight | 7. More | 12. Equal | 17. Watt/m ² |
| 3. 50 | 8. Red | 13. Fundamental | 18. Intensity |
| 4. Opaque | 9. Ultrasonic | 14. Mirage | 19. Reflection |
| 5. Higher | 10. 20 | 15. Ultrasonic | |

*(5) Give reason for:

- Due to the refraction of light rays coming from the immersed part in water, where the eye sees the immersed part of the pencil on the extensions of these refracted rays.
- Because they have high ability to kill some types of bacteria and stop the action of some viruses.
- Because it is an opaque medium.
- Because angle of incidence = angle of reflection = zero.
- Because the frequency of red light photon is less than that of orange light photon.
- Because the density of carbon dioxide gas is more than that of air, since sound intensity is directly proportional to the density of the medium.
- Due to reflection and refraction of light in air layers which differ in the degree of temperature.
- Because it is electromagnetic waves which don't need a medium to travel through.
- Because clear glass permits most light to pass through and objects can be seen clearly through it.
- Because the velocity of light waves of lightning (electromagnetic waves) is much greater than that of sound waves of thunder (mechanical waves).
- Due to the refraction of light rays coming from the submerged object (far from the normal) where the eye sees the submerged object on the extensions of the refracted rays.


*(6) What happen if:

- Sound intensity will decrease
- The white light analysis into seven colours.
- The light intensity decreases to its quarter.
- The intensity of the produced tone increases.
- The light rays are reflected in many directions.
- The light ray will reflect on itself

★ (7) Put (✓) or (X) :

1. (✓)	4. (X)	7. (X)	10. (✓)	13. (X)
2. (X)	5. (X)	8. (✓)	11. (✓)	
3. (X)	6. (X)	9. (✓)	12. (X)	

★ (8) Problems:

1	<p>Sound frequency (F)</p> $= \frac{\text{Number of cycles (d)} \times \text{Number of gear teeth (n)}}{\text{Time in seconds (t)}}$ $= \frac{960 \times 30}{120} = 240 \text{ Hz.}$	6	1. 2 2. 4 3. Medium (B).
2	<p>The absolute refractive index of diamond</p> $= \frac{\text{Velocity of light through air}}{\text{Velocity of light through diamond}}$ $2.4 = \frac{3 \times 10^8}{\text{Velocity of light through diamond}}$ <p>Velocity of light through diamond</p> $= \frac{3 \times 10^8}{2.4} = 1.25 \times 10^8 \text{ m/sec.}$	7	 <p>Fig. (1) Fig. (2)</p> <p>1. 60° 2. zero</p>
3	<p>Sound frequency (F) =</p> $\frac{\text{Number of cycles (d)} \times \text{Number of gear teeth (n)}}{\text{Time in seconds (t)}}$ $600 = \frac{300 \times \text{Number of gear teeth}}{60}$ <p>Number of gear teeth = $\frac{600 \times 60}{300} = 120 \text{ teeth.}$</p>	8	<p>1. Angle of incidence = $90^\circ - 30^\circ = 60^\circ$ Angle of reflection = $90^\circ - 30^\circ = 60^\circ$ 2. Angle of incidence = Angle of reflection 3. It will reflect on itself.</p>
4	<p>Sound frequency (F) =</p> $\frac{\text{Number of cycles (d)} \times \text{Number of gear teeth (n)}}{\text{Time in seconds (t)}}$ $160 = \frac{960 \times \text{Number of gear teeth}}{180}$ <p>Number of gear teeth = $\frac{160 \times 180}{960} = 30 \text{ teeth.}$</p>	9	<p>1. incident ray. 2. refracted ray. 3. angle of incidence. 4. angle of refraction.</p>
5	<p>1. (a) 2. 140°</p> <p>3. The incident light ray, the reflected light ray and the normal to the surface of reflection at the point of incidence, all locate in one plane perpendicular to the reflecting surface.</p>		